

EFFECT OF MORINGA (*Moringa oleifera*) LEAVES POWDER ON SENSORY AND PHYSICO-CHEMICAL QUALITY OF COW MILK LASSI

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ABSTRACT

The Moringa (*Moringa oleifera*) leaves powder was utilized for the preparation of cow milk lassi. The lassi was prepared in the proportion of 100:0 (T₁), 98:2 (T₂), 96:4 (T₃), 94:6 (T₄) and 92:8 (T₅) dahi to moringa leaves powder and sugar with 15 %. Experiment was laid out with five treatments and four replications in completely randomized design (CRD). The lassi prepared by blending with 4 parts of moringa leaves powder (T₃) had highest score for flavour (40.50 out of 45), body and texture (33.50 out of 35), colour and appearance (8.30 out of 10) and overall acceptability (8.5 out of 9 by hedonic scale) and ranked as the most acceptable treatment. The lassi prepared with addition of 4 parts of moringa leaves powder contained as 3.7, 4.25, 14.81, 85.19, 0.90, 0.60 and 4.76 per cent fat, protein, total solids, moisture, ash, per cent acidity and pH respectively. The cost of lassi prepared with 4 parts of moringa leaves powder (T₃) was Rs. 68.01 kg. Hence, it is inferred that best quality lassi can be prepared by using 4 parts of moringa leaves powder and 96 parts of dahi with 15 per cent sugar.

(Key words : Dahi, lassi, moringa leaves powder, sensory evaluation, cost structure)

INTRODUCTION

Fermented milk products occupy an important place in the diet of Indians where majority of the population is vegetarians and for them milk and milk products are one of the main source of animal protein. About 9 per cent of total milk produced in India is converted into fermented milk products and this sector is showing an annual growth rate of more than 20% annum⁻¹. Lassi is creamy viscous fluid with rich aroma and mildly acidic taste.

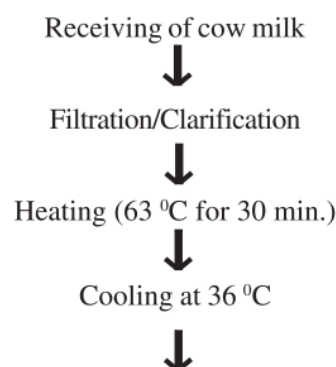
Moringa oleifera has numerous medicinal uses, which have long been recognized in the ayurvedic and Unani systems of medicine. Almost all part of drumstick viz. bark, fruits, leaves, flowers, seeds and gum is a rich repository of proteins, vitamins and minerals including potassium, calcium, phosphorus, iron, folic acid as well as carotene.

The leaves possess remarkable nutritional and medicinal quality. They contain high amount of vitamin C which fights a host of illness including colds and flu, vitamins A which acts as a shield against eye diseases, skin disease, heart ailments diarrhea, many other disease. Hence, it was planned to prepare lassi by using moringa leaves powder with the objectives to study the optimum level of moringa leaves powder for preparation of lassi with sensory, physico-chemical quality and cost structure.

MATERIALS AND METHODS

The preparation of moringa lassi by incorporation different levels of moringa leaves powder was undertaken in the section of Animal Husbandry and Dairy science, College of Agriculture Nagpur, during 2018-19. Moringa leaves powder was added in lassi at different levels, i. e. 100:0 (T₁), 98:2 (T₂), 96:4 (T₃), 94:6 (T₄) and 92:8 (T₅) dahi to moringa leaves powder and sugar @ 15 % with four replications. The flow chart for preparation of moringa leaves powder lassi is given as follows :

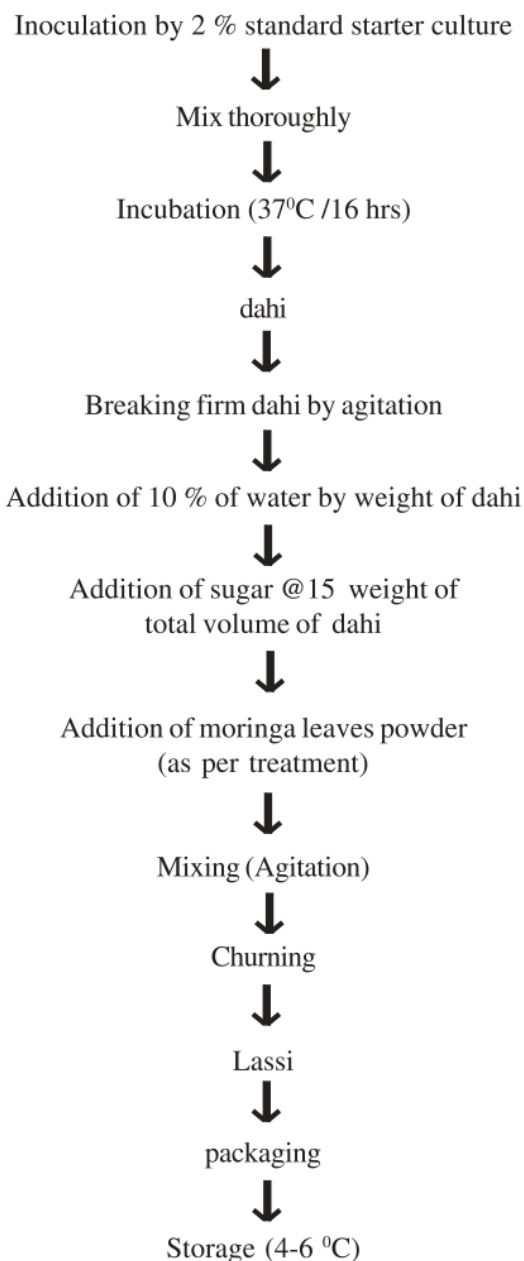
Fig. 1. Flow chart for preparation of moringa leaves powder lassi



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The quality of moringa leaves powder lassi was judged by offering the sample to the panel of 5 judges in each trial separately by score card method for sensory evaluation by using 100 point score card prescribed by Anonymous (1981)

The product was subjected to chemical analysis of fat by Gerber's method, IS: 1224, Part I, (Anonymous, 1977), protein by macro-kjeldahl method, IS:1479 Part II, (Anonymous, 1961), total solids by gravimetric, IS :1479, Part II (Anonymous, 1961), ash by IS: 1479 Part II (Anonymous, 1961), titrable acidity by IS 1166 part I (Anonymous, 1973), pH by digital pH meter and moisture was determined by subtracting the total solid content from 100 in the sample.

The experiment was laid out in completely randomized design (CRD) with 5 treatments and 4

replications. The data obtained were analyzed statistically according to method described by Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

Sensory evaluation of moringa leaves powder lassi

The data with respect to sensory evaluation of moringa leaves powder lassi are presented in table 1 indicated that mean score for flavour (40.50), body and texture (33.50), colour and appearance (8.30), acidity (7.56) and overall acceptability (8.5 out of 9 by Hedonic scale) were highest in lassi prepared with addition of 4 part of moringa leaves powder 96 part of dahi @ 15% sugar (T₃) while, lowest score obtained in lassi prepared without addition of moringa leaves powder 0 parts of moringa leaves powder 100 parts of dahi and 15% sugar (T₁). It is observed that score recorded by judges increased upto certain limits of addition of moringa leaves powder then it was decreased. The higher score secured by judges for lassi prepared with addition of 4 parts of moringa leaves powder plus 96 parts of dahi and 15 % of sugar (T₃). Similar results were reported by Gaikwad *et al.* (2018). They reported lassi prepared with 4 per cent menthol juice (T₃) found superior. Khupse *et al.* (2018). Prepared honey lassi, prepared by addition of 12 per cent honey (T₃) found superior over the rest treatments.

Physico-chemical attributes of moringa leaves powder lassi

Data from table 2 indicates that significantly higher content fat (3.76 %) and moisture (88.42%) were observed in lassi prepared without addition of moringa leaves powder T₁ (100 part of dahi and 0 parts of moringa leaves powder). Similarly higher content of protein (5.20 %), total solids (18.05 %) and ash (1.18 %) were observed in lassi prepared with addition of 8 parts of moringa leaves powder. The pH value and acidity was not affected significantly. The data revealed that protein, total solids and ash content of lassi were increased with the increase in level of moringa leaves powder while fat, moisture and acidity content were decreased with increase in level of moringa leaves powder. Similar results were reported by Tambe (2017). They prepared lassi by addition of papaya pulp at 0 (T₁), 5 (T₂), 10 (T₃) and 15 per cent (T₄) and found fat content of 5.42, 5.25, 5.04 and 4.81 per cent respectively. The increase in level of papaya pulp reduced fat content significantly. Dubey *et al.* (2018) reported that moisture percentage of shrikhand prepared without addition of moringa leaves powder (T₀) was highest (41.20) while, moisture content was lowest (38.60 per cent) of shrikhand prepared with addition of 3 per cent moringa leaves powder. Dubey *et al.* (2018) analyzed protein content of shrikhand blended with moringa leaf powder in different proportion of 100:0 (T₀), 99:1 (T₁), 98:2 (T₂) and 97:3 (T₃) shrikhand to moringa leaf powder. They observed that increase in level of moringa leaf powder there was proportionately increase in the level of protein content in shrikhand. Khupse *et al.* (2015) reported that, total solids percentage was significantly highest (21.64 %) in lassi

prepared with 14% honey (T₄), while total solids content was lowest (17.30%) in lassi prepared without addition of honey (T₁). Ghule *et al.* (2015) reported that the increase in the level of strawberry pulp increased ash content of lassi increased from 0.73 to 0.85 per cent.

Cost of production

The cost of production of moringa leaves powder prepared with 4 parts moringa leaves powder (T₃) was found

to be Rs.68.011⁻¹ which was best treatment selected by judges for sensory evaluation. This result is in agreement with Patil *et al.* (2017), who reported the cost of production of 1 kg yoghurt drink ranged from Rs 60.06 to Rs. 63.96.

Hence, it may be inferred that best quality lassi can be prepared by addition of 4 parts of moringa leaves powder and 96 parts of dahi with 15% sugar.

Table 1. Overall sensory scores for different sensory attributes of moringa leaves lassi as affected by different levels of moringa leaves powder

Treatments	Flavour (45)	Body and texture (35)	Colour and appearance (10)	Acidity (10)	Total (100)	Overall acceptability (By Hedonic scale)
T ₁	33.50	27.60	7.30	6.49	74.89	6.0 ^e
T ₂	37.30	29.10	7.60	6.84	80.84	6.5 ^d
T ₃	40.50	33.50	8.30	7.56	89.86	8.5 ^a
T ₄	36.50	31.90	8.04	7.60	84.04	7.6 ^b
T ₅	35.50	31.62	8.10	7.76	82.98	7.0 ^c
S E (m) ±	0.84	0.21	0.11	0.36		0.13
C D @5%	2.55	0.64	0.33	-		0.36

Table 2. Overall average of physico-chemical attributes of lassi as affected by different levels of moringa leaves powder

Treatments	Fat	Protein	Total solids	Moisture	Ash	Acidity	pH
T ₁	3.76	3.30	1158	88.42	0.62	0.62	4.74
T ₂	3.73	3.77	13.19	86.81	0.76	0.61	4.75
T ₃	3.70	4.25	14.81	85.19	0.90	0.60	4.76
T ₄	3.67	4.72	16.43	83.57	1.04	0.59	4.77
T ₅	3.64	5.20	18.05	81.95	1.18	0.58	4.78
S E (m)	0.009	0.014	0.015	0.015	0.006	0.007	0.007
C D @5%	0.027	0.044	0.046	0.046	0.019	-	-

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